

CLAIMS:

1. A pre-label receiver sheet comprising in order
 - (a) a pragmatic pre-label sheet comprising:
 - (i) a polymeric image-receiving layer;
 - (ii) a pragmatic polymer film, either a multi-layer or single layer film, comprising a microvoided layer, in a continuous phase, a polylactic-acid-based material, the microvoided layer having microvoids that provide a void volume of at least 25 percent by volume, wherein at least about half of the microvoids are formed from void initiating particles not more than 1.2 micrometer in average diameter;
 - (b) a pressure-sensitive adhesive layer; and
 - (c) a carrier sheet such that the pressure-sensitive adhesive layer is releasably covered with the carrier sheet in peelable adhesion.
- 15 2. The sheet of claim 1 wherein the particles are present in an amount of at least 10 weight percent, based on the total weight of the microvoided layer, and are 0.1 to 1.0 micrometers in average diameter.
- 20 3. The sheet of claim 2 wherein the particles are in the range of 0.2 to 0.8 micrometers in average diameter.
4. The sheet of claim 1 wherein the image-receiving layer exhibits a 60 degree gloss of greater than 45.
- 25 5. The sheet of claim 4 wherein the image-receiving layer exhibits a 60 degree gloss of greater than 55.
- 30 6. The sheet of claim 1 wherein the pragmatic polymer film is extruded as a single layer.

7. The sheet of claim 1 wherein the microvoided layer is biaxially oriented.

8. The sheet of claim 1 wherein the pragmatic pre-label 5 sheet has a thickness of from about 25 to about 400 μm .

9. The sheet of claim 1 wherein the polylactic-acid-based material is composed of at least 75% by weight of poly(L-lactic acid).

10 10. The sheet of claim 1 wherein the particles are inorganic and make up from about 25 to about 75 weight % of the total weight of the microvoided layer.

11. The sheet of claim 1 wherein the particles are organic 15 and comprise from about 10 to about 45 weight % of the total weight of the microvoided layer.

12. The sheet of claim 1 wherein said polylactic-acid-based material is a mixture of at least 90% poly(L-lactic acid) and at least 1% 20 poly(D-lactic acid).

13. The sheet of claim 10 wherein the inorganic particles are present in an amount between 35 to 65 weight %.

25 14. The sheet of claim 10 wherein the inorganic particles are selected from the group consisting of barium sulfate, calcium carbonate, zinc sulfide, zinc oxide, titanium dioxide, silica, alumina, and combinations thereof.

30 15. The sheet of claim 1 wherein the pragmatic polymer film is multi-layer composite film.

16. The sheet of claim 15 wherein the pragmatic polymer film comprises a second layer comprising a voided or non-voided polylactic-acid-based material and is adjacent to and integral with the microvoided layer.

5 17. The sheet of claim 16 wherein the pragmatic polymer film comprises a third layer that is microvoided with the second layer between the microvoided first and third layers.

10 18. The sheet of claim 17 wherein the microvoided first and third layers consist of a same material and the second layer is non-voided.

19 The sheet of claim 1 wherein the polylactic-acid-based material comprises additional polymers or blends of other polyesters.

15 20. The sheet of claim 1 wherein the carrier sheet is laminated to the pragmatic pre-label sheet so that a front surface of the carrier sheet faces a back surface of the pragmatic pre-label sheet.

20 21. The sheet of claim 1 wherein at least one pragmatic-label portion is formed in the pragmatic pre-label sheet by cutting a shape through the pragmatic pre-label sheet but not through the carrier sheet.

22. The sheet of claim 1 wherein the image-receiving layer comprises a polyester material.

25 23. The sheet of claim 1 wherein the pragmatic polymer film further comprises a coextruded second layer in addition to the microvoided layer, said microvoided layer having a top side and a bottom side, wherein the coextruded second layer is on the bottom side of the microvoided layer and the image-receiving layer is on the top side of the microvoided layer.

24. The sheet of claim 1 wherein the pragmatic pre-label sheet consists essentially of only coextruded biaxially stretched layers above the pressure-sensitive adhesive layer.

5 25. The sheet of claim 1 wherein the pragmatic pre-label sheet consists essentially of an image-receiving layer and the pragmatic polymer film.

10 26. The sheet of claim 1 wherein the carrier sheet comprises more than one layer.

27. The sheet of claim 1 further comprises at least one image in the image-receiving layer formed by imagewise thermal dye transfer.

15 28. The sheet of claim 1 wherein cutting lines are formed at least partially through the pragmatic pre-label sheet to form a label sheet, so to allow peeling of at least one pragmatic label portion comprising a portioned (a) imaged image-receiving layer, (b) substrate, and (c) bottom pressure-sensitive adhesive layer, wherein the substrate consists of all the layers, 20 including a portioned (i) pragmatic polymer film and (ii) optional intermediate sheet, between the image-receiving layer and the bottom pressure-sensitive layer.

25 29. The sheet of claim 28 where the label sheet comprises a plurality of pragmatic-label portions and cutting lines are formed around and through each of the plurality of pragmatic-label portions but substantially not in or through the carrier sheet.

30 30. The sheet of claim 29 wherein multiple pragmatic-label portions in the label sheet are formed by sectioning the label sheet into a plurality of frames each forming a separable pragmatic label.

31. The sheet of claim 27 wherein the at least one image has a print density of at least 1.5.

32. The sheet of claim 1 wherein the microvoided layer comprises, in a continuous phase, polylactic-acid-based material having dispersed therein void initiators selected from the group consisting of crosslinked organic microbeads, inorganic particles, a combination thereof, and each of the foregoing in combination with non-crosslinked polymer particles that are immiscible with the polylactic-acid-based material.

33. The sheet of claim 1 wherein the microvoided layer comprises, in a continuous phase, polylactic-acid-based material having dispersed therein a blend of inorganic and non-crosslinked polymer particles that are immiscible with the polylactic-acid-based material.

34. The sheet of claim 33 wherein the ratio of the volume of inorganic to the volume of said non-crosslinked polymer particles that are immiscible with the polylactic-acid-based material is from 4:1 to 1:4.

35. The sheet of claim 1 wherein the pragmatic polymer film comprises a core layer comprised of a non-voided polylactic-acid-based material or a polylactic-acid-based material voided with non-crosslinked polymer particles.

36. The sheet of claim 32 wherein the non-crosslinked polymer particles that are immiscible with the polylactic-acid-based material have an olefinic backbone.

37. The sheet of claim 1 wherein the thickness of the microvoided layer is from 20 to 150 micrometers.

38. The sheet of claim 1 wherein the image-receiving layer comprises a polymeric binder containing a polyester and/or polycarbonate.

39. The sheet of claim 1 wherein the pragmatic pre-label sheet is imaged with a thermal-dye-transfer process including imaging with fiducial marks having a density of greater than 0.5.

5 40. The sheet of claim 1 wherein the carrier sheet comprises exposed edges having a width of less than 20 mm.

41. The sheet of claim 1 wherein the carrier sheet has a stiffness of between 15 and 60 milliNewtons.

10 42. A thermal-dye-transfer assemblage comprising a dye-donor element, and the pre-label sheet of claim 1.

15 43. A process for making a pre-label sheet comprising a pragmatic pre-label sheet and a carrier sheet, which pragmatic pre-label sheet comprises, in order, a polymeric image-receiving layer, a pragmatic polymer film, and a bottom pressure-sensitive adhesive layer, which process comprises the following steps:

20 (a) providing a pragmatic pre-label sheet by the following steps:

(i) blending void-initiating particles not more than 1.2 micrometers in average diameter into a first melt comprising a polylactic-acid-based material;

25 (ii) coextruding or extruding the first melt to form a cast single-layer or multi-layer film comprising at least one layer made from the first melt;

(iii) stretching the cast film biaxially to reduce its thickness and to form microvoids around the particles, thereby obtaining an oriented stretched film;

(iv) optionally applying an intermediate sheet,

5 comprising one or more layers, to a back surface of the oriented stretched film;

(v) applying a pressure-sensitive adhesive layer, or a laminate comprising a pressure-sensitive adhesive layer, to at least a portion of the back surface of the oriented stretched film, on a side opposite the image-receiving layer, to form a pre-label receiver sheet or, when an intermediate

10 sheet is present, to at least a portion of a back surface of the intermediate sheet; and

(vi) applying an image-receiving layer to the pragmatic polymer film either by coextruding the image-receiving layer with the pragmatic polymer film or by solvent coating the image-receiving layer on the

15 pragmatic polymer film; and

(b) providing the pre-label sheet with a carrier sheet such that the adhesive layer of the pre-label sheet is releasably covered with the carrier sheet in peelable adhesion.

20 44. A process for making a pre-label receiver sheet comprising a pragmatic pre-label sheet and a carrier sheet, which pragmatic pre-label sheet comprises, in order, a polymeric image-receiving layer, a pragmatic polymer film, and an adhesive layer, which process comprises the following steps:

25 (a) providing a pragmatic pre-label sheet by the following steps:

(i) blending void-initiating particles not more than 1.2 micrometers in average diameter into a first melt comprising a polylactic-acid-based material;

30 (ii) co-extruding a second melt for a polymeric image-receiving layer with one or more other melts for forming a single-layer or

multiple-layer pragmatic polymer film, wherein the one or more other melts includes a first melt for forming a microvoidable layer, thereby forming a co-extruded cast composite film comprising at least the image-receiving layer and the microvoidable layer;

5 (iii) stretching in at least one direction the cast composite film to reduce the thickness of the layers in the composite film and to produce an oriented stretched film, wherein the image-receiving layer is less than 15 micrometers thick;

10 (iv) optionally applying an intermediate sheet, comprising one or more layers, to a back surface of the oriented stretched film; and

15 (v) applying a pressure-sensitive adhesive layer, or a laminate comprising a pressure-sensitive adhesive layer, to at least a portion of the back surface of the oriented stretched film, on a side opposite the image-receiving layer, or when an intermediate sheet is present, to at least a portion of a back surface of the intermediate sheet; and

(b) providing the pre-label sheet with a carrier sheet such that the adhesive layer of the pre-label sheet is releasably covered with the carrier sheet in peelable adhesion.

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45. The process of claim 43 wherein the particles are in the range of 0.1 to 1.0 micrometers in average diameter.

46. The process of claim 43 wherein the microvoided layer comprises, in a continuous phase, a polylactic-acid based material having dispersed therein void initiators selected from the group consisting of crosslinked organic microbeads, inorganic particles, a combination thereof, and each of the foregoing in combination with non-crosslinked polymer particles that are immiscible with the polylactic-acid based material, the microvoided layer has a void volume of at least 25 percent by volume.

47. The process of claim 43 wherein the microvoided layer comprises, in a continuous phase, a polylactic-acid based material having dispersed therein a mixture of either crosslinked organic microbeads or inorganic particles in combination with non-crosslinked polymer particles that are immiscible with the polylactic-acid based material, the layer having a void volume of at least 25 percent by volume.

48. The process of claim 43 wherein the pragmatic polymer film further comprises a coextruded second layer on a side of the microvoided layer opposite the image-receiving layer which third layer comprises a voided or non-voided material.

49. The process of claim 48 further comprising a coextruded third layer on a side of the second layer opposite the microvoided layer which third layer comprises a microvoided material wherein the coextruded third layer comprises poly(lactic acid).

50. The process of claim 43 wherein the microvoided layer has a void volume of from 25 to 65 volume percent.

51. A label made from the pre-label sheet of claim 1 that can be adhesively applied to an objective object.